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EXAMINER	
RICE, ELISA M	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/529,174	TROPF, HERMANN	
	Examiner	Art Unit	
	ELISA M. RICE	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-14,16-19 and 21* is/are rejected.

7)☒ Claim(s) *4,15, 20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 July 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/28/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare In re Lowry, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and Warmerdam, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

Claims 1-9, 11-16 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. The Federal Circuit[1], relying upon Supreme Court precedent[2], has indicated that a statutory "process" under 35 U.S.C. 101 must (1) be tied to a particular machine or apparatus, or (2) transform a particular article to a different state or thing. This is referred to as the "machine or transformation test", whereby the recitation of a particular machine or transformation of an article must impose meaningful limits on the claim's scope to impart patent-eligibility (See *Benson*, 409 U.S. at 71-72), and the involvement of the machine or transformation in the claimed process must not merely be insignificant extra-solution activity (See *Flook*, 437 U.S. at 590"). While the instant claim(s) recite a series of steps or acts to be performed, the claim(s) neither transform an article nor are positively tied to a particular machine that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. That is, the method includes steps of imaging, illuminating, etc. is of sufficient breadth that it would be reasonably interpreted as a series of steps completely performed mentally, verbally, or without a machine. The cited claims do not positively recite any structure within the body of the claim which ties the claim to a statutory category. Furthermore, the examiner suggests that the structure needs to tie in the basic inventive concept of the application to a statutory category. Structure that ties insignificant pre or post solution activity to a statutory category is not sufficient in overcoming the 101 issue. Additionally, the limitations do not claim data that represents

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[1] *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

a physical object or substance, the data representing the physical object is not present and therefore can not be modified by the process in a meaningful or significant manner, and no meaningful and significant external, non-data depiction of a physical object or substance is produced. Thus, the limitations do not satisfy the transformation test.

[1] *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

[2] *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).

Claims 10, 11 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claims 10, 11 recite a mere compilation of data/data collection by itself and within a computer readable medium such as a CD or DVD which does not impart functionality to a computer or computing device, and is thus considered nonfunctional descriptive material. Such nonfunctional descriptive material, in the absence of a functional interrelationship with a computer, does not constitute a statutory process, machine, manufacture or composition of matter and is thus non-statutory per se.

Claim 17 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 17 defines a computer readable storage means embodying functional descriptive material. However, the claim does not define a computer-readable medium or computer-readable memory and is thus non-statutory for that reason (i.e., "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally

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[2] *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk*

interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized" – Guidelines Annex IV). The scope of the presently claimed invention encompasses products that are not necessarily computer readable, and thus NOT able to impart any functionality of the recited program. The examiner suggests amending the claim(s) to embody the program on "computer-readable medium" or equivalent; assuming the specification does NOT define the computer readable medium as a "signal", "carrier wave", or "transmission medium" which are deemed non-statutory (refer to "note" below). Any amendment to the claim should be commensurate with its corresponding disclosure.

Note:

"A transitory, propagating signal … is not a "process, machine, manufacture, or composition of matter." Those four categories define the explicit scope and reach of subject matter patentable under 35 U.S.C. § 101; thus, such a signal cannot be patentable subject matter." (*In re Petrus A.C.M. Nuijten;* Fed Cir, 2006-1371, 9/20/2007).

Should the full scope of the claim as properly read in light of the disclosure encompass non-statutory subject matter such as a "signal", the claim as a whole would be non-statutory. In the case where the specification defines the computer readable medium or memory as statutory tangible products such as a hard drive, ROM, RAM, etc, as well as a non-statutory entity such as a "signal", "carrier wave", or "transmission

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v. Benson, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).

medium", the examiner suggests amending the claim to *include* the disclosed tangible computer readable media, while at the same time *excluding* the intangible media such as signals, carrier waves, etc.

Claim 17 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 17 is drawn to functional descriptive material recorded on a computer readable means. However, the specification, but does not specifically define a computer-readable means as non-transitory, statutory examples. Therefore, according to 1351 OG 212, dated 2/23/2010, computer readable means will be reasonably interpreted to cover both non-transitory tangible media and transitory propagating signals per se in view of the ordinary and customary meaning of computer readable media. Furthermore, examiner notes that the cited interpretation is valid even if the specification is silent in regards to computer readable media and other such variations.

"A transitory, propagating signal … is not a "process, machine, manufacture, or composition of matter." Those four categories define the explicit scope and reach of subject matter patentable under 35 U.S.C. § 101; thus, such a signal cannot be patentable subject matter." (*In re Petrus A.C.M. Nuijten;* Fed Cir, 2006-1371, 9/20/2007).

Because the full scope of the claim as properly read in light of the disclosure encompasses non-statutory subject matter, the claim as a whole is non-statutory. The examiner suggests amending the claim to *include* the disclosed tangible computer

readable media, while at the same time *excluding* the intangible media such as signals, carrier waves. Any amendment to the claim should be commensurate with its corresponding disclosure.

Examiner suggests, as seen within 1351 OG 212 dated 2/23/2010, applicant include the limitation, "non-transitory", within the cited claims to overcome the rejection and to avoid any issues of new matter.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. **Claims 1, 2, 5-7, 10-14, 16-19, 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kodama et al (US 2001/0040225 A1).

Regarding **claim 1**, Kodama discloses a method for establishing a data collection with the aid of at least one imaging means and at least one illuminating device (see fig. 4, 6, paragraph 0007; lighting, in each one of a plurality of different directions, at least a

portion of the object, taking an image of the portion of the object and a vicinity of the portion which are lighted in the each one of the different directions, synthesizing the respective images of the portion of the object taken by lighting the portion in the different directions),

wherein an object is imaged from different imaging directions (see paragraph 0053; elow each of the two lighting devices 70, a corresponding one of the two EC cameras 72 is provided such that the one EC camera 72 is oriented in a vertically upward direction, so that the one EC camera 72 can take an image of the EC 28 positioned above the each lighting device 70 through the aperture 78. Each of the two EC cameras 72 is provided

by a CCD camera, and cooperates with a corresponding one of the two lighting

devices 70 to provide a lighting and image-taking device 80 which takes an image of the EC 28) and

illuminated from at least three different illumination directions, each in direct light,

wherein one imaging direction each being substantially opposed to one illumination direction (see fig. 6, paragraph 0060, 0008; control device 100 sequentially

operates the LEDs 74 of each one of the predetermined lighting areas to emit light toward the EC 28. FIG. 6 shows the EC 28 and the lighting device 70, upside down, for easier understanding purposes only. The image processing program includes, for a sort and/or a shape of each EC 28, control data to divide the LEDs 74 into a plurality of predetermined lighting areas and operate the lighting areas to sequentially emit light in a predetermined order. In the present embodiment, since the EC 28 has a rectangular surface, the LEDs 74 are divided into four lighting areas each of which lights the EC 28 in a corresponding one of four directions which are perpendicular to the four sides of the rectangular surface, respectively),

so that from each of the three imaging directions at least one contour of the object appears with a light side and a shade side of the object (see fig. 6, paragraph 0060; a first one of the four lighting areas is operated to emit light, a shadow of the EC 28 is formed in a portion of a vicinity of the EC 28 that is located on one side thereof opposite to the first lighting area, so that the EC camera 72 takes an image 120 of the EC 28 and an image 122 of the shadowed portion of the vicinity of the EC 28. In FIG. 6, the image 120 of the EC 28 is indicated at broken line, because an image of the other portion of the vicinity of the EC 28 than the shadowed portion may be light and a bound between that image and the image 120 of the EC 28 may be unclear. Thus, the image 122 of the shadowed portion is significantly dark as compared with the image 120 of the EC 28 and the image of the other portion of the vicinity of the same 28. A batch of image data representing the thus taken image including the images 120, 122 is stored in one frame buffer of the RAM 106 of the computer),

and substantially the complete object is imaged from the at least three imaging directions by the at least one imaging means (see fig. 6, paragraph 0060; a second, a third, and a fourth lighting area are sequentially operated to emit light toward the EC 28, so that the EC camera 72 takes an image of the EC 28 which is lighted by each one of the second, third, and fourth lighting areas),

wherein the imaging directions and the illumination directions, on the one hand, and the object, on the other, are movable defined relative to each other with several degrees (see fig. 6, paragraph 0069; a plurality of divided areas can cooperate with each other to provide a lighting area. In the latter manner, if the way of combination of two or more divided areas can be changed, then the degree of freedom can be increased with respect to the selection of position

and/or size of each lighting area. Moreover, the latter manner enjoys an advantage that each lighting device 70 enjoys a simpler construction than that of a lighting device which employs a plurality of LEDs each one of which is turned on and off, independent of the other LEDs. In the latter manner, each divided area may be provided by an array of LEDs 74 arranged in an elevation angle, an array of LEDs 74 arranged in an azimuth angle, or a matrix of LEDs 74 having a same number (e.g., two) of LEDs 74 in each of elevation and azimuth angles) and wherein the images and/or the data derived therefrom are stored in the data collection (see paragraph 0060; atch of image data representing the thus taken image including the images 120, 122 is stored in one frame buffer of the RAM 106 of the computer). Kodama does not disclose expressly imaging from at least three different imaging directions.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to image from at least three different imaging directions. Applicant has not disclosed that image from at least three different imaging directions provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with either the two imaging directions as taught by Kodama or the claimed at least three different imaging directions because the quantity of directions perform the same function of imaging an object at multiple angles or orientations in order to have at least one image that contains the entire object and one image that contains at least a portion of the shadow created by the captured object, considering objects that are to be picked up by robots are not outlandishly large in dimension/size.

Therefore, it would have been obvious to combine to one of ordinary skill in this art to modify Kodama to obtain the invention as specified in claim 1.

Regarding **claim 2**, Kodama discloses various relative positions of image capture devices and illumination devices, on the one hand, and of the object, on the other (see paragraph 0007).

Regarding **claim 5**, Kodama discloses imaging is performed substantially from the imaging directions via fight from the substantially opposed illumination direction, preferably by switching (see 0019) and/or by polarization and/or spectra] filtering and/or by use of at least one color rendering image capture device.

Regarding **claim 6**, Kodama discloses position of the image capture devices and illumination devices is changed mutually (see paragraph 0008).

Regarding **claim 7**, Kodama discloses position of the image capture devices and illumination devices is determined by a robotic setting (see paragraph 0016).

Regarding **claim 10**, Kodama discloses a data collection with images and/or data (see paragraph 0060) derived therefrom, structured as set forth in claim 1 (see rejection for claim 1).

Regarding **claim 11**, Kodama discloses a computer-readable storage medium with data which form a data collection (see paragraph 0060) as set forth in claim 10 (see rejection of claim 10).

Regarding **claim 12**, Kodama discloses a method of gripping an object from a plurality of objects with the aid of at least one imaging means and at least one illuminating device (see fig. 4, 6, paragraph 0007; lighting, in each one of a plurality of different directions, at least a portion of

the object, taking an image of the portion of the object and a vicinity of the portion which are lighted in the each one of the different directions, synthesizing the respective images of the portion of the object taken by lighting the portion in the different directions),

wherein the object is imaged from at least three different imaging directions (see paragraph 0053; elow each of the two lighting devices 70, a corresponding one of the two EC cameras 72 is provided such that the one EC camera 72 is oriented in a vertically upward direction, so that the one EC camera 72 can take an image of the EC 28 positioned above the each lighting device 70 through the aperture 78. Each of the two EC cameras 72 is provided

by a CCD camera, and cooperates with a corresponding one of the two lighting

devices 70 to provide a lighting and image-taking device 80 which takes an image of the EC 28) and is illuminated from at least three different illumination directions, each in direct tight,

wherein one imaging direction each being substantially opposed to one illumination direction (see fig. 6, paragraph 0060, 0008; control device 100 sequentially

operates the LEDs 74 of each one of the predetermined lighting areas to emit light toward the EC 28. FIG. 6 shows the EC 28 and the lighting device 70, upside down, for easier understanding purposes only. The image processing program includes, for a sort and/or a shape of each EC 28, control data to divide the LEDs 74 into a plurality of predetermined lighting areas and operate the lighting areas to sequentially emit light in a predetermined order. In the present embodiment, since the EC 28 has a rectangular surface, the LEDs 74 are divided into four lighting areas each of which lights the EC 28 in a corresponding one of four directions which are perpendicular to the four sides of the rectangular surface, respectively),

so that from each of the three imaging directions at least on contour at least one contour each of

the object appears with a light side and a shadow side of the object (see fig. 6, paragraph 0060; a first one of the four lighting areas is operated to emit light, a shadow of the EC 28 is formed in a portion of a vicinity of the EC 28 that is located on one side thereof opposite to the first lighting area, so that the EC camera 72 takes an image 120 of the EC 28 and an image 122 of the shadowed portion of the vicinity of the EC 28. In FIG. 6, the image 120 of the EC 28 is indicated at broken line, because an image of the other portion of the vicinity of the EC 28 than the shadowed portion may be light and a bound between that image and the image 120 of the EC 28 may be unclear. Thus, the image 122 of the shadowed portion is significantly dark as compared with the image 120 of the EC 28 and the image of the other portion of the vicinity of the same 28. A batch of image data representing the thus taken image including the images 120, 122 is stored in one frame buffer of the RAM 106 of the computer),

and substantially the complete object is imaged from the at least three imaging directions by the at least one imaging means (see fig. 6, paragraph 0060; a second, a third, and a fourth lighting area are sequentially operated to emit light toward the EC 28, so that the EC camera 72 takes an image of the EC 28 which is lighted by each one of the second, third, and fourth lighting areas),

wherein the imaging directions and the illumination directions, on the one hand, and the object, on the other, are movable defined relative to each other with several degrees (see fig. 6, paragraph 0069; a plurality of divided areas can cooperate with each other to provide a lighting area. In the latter manner, if the way of combination of two or more divided areas can be changed, then the degree of freedom can be increased with respect to the selection of position and/or size of each lighting area. Moreover, the latter manner enjoys an advantage that each

lighting device 70 enjoys a simpler construction than that of a lighting device which employs a plurality of LEDs each one of which is turned on and off, independent of the other LEDs. In the latter manner, each divided area may be provided by an array of LEDs 74 arranged in an elevation angle, an array of LEDs 74 arranged in an azimuth angle, or a matrix of LEDs 74 having a same number (e.g., two) of LEDs 74 in each of elevation and azimuth angles). Kodama does not disclose expressly imaging from at least three different imaging directions.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to image from at least three different imaging directions. Applicant has not disclosed that image from at least three different imaging directions provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with either the two imaging directions as taught by Kodama or the claimed at least three different imaging directions because the quantity of directions perform the same function of imaging an object at multiple angles or orientations in order to have at least one image that contains the entire object and one image that contains at least a portion of the shadow created by the captured object, considering objects that are to be picked up by robots are not outlandishly large in dimension/size.

Therefore, it would have been obvious to combine to one of ordinary skill in this art to modify Kodama to obtain the invention as specified in claim 12.

Regarding **claim 13**, Kodama discloses a method of gripping ….. by the at least one imaging means (see rejection of claim 12), wherein reference images and/or data

derived therefrom contained in a data as set forth in claim 10 are used (see rejection of claim 10).

Regarding **claim 14**, Kodama discloses images of the object and images or derived data in the data collection are compared (see fig. 6, paragraph 0061).

Regarding **claim 16**, Kodama discloses imaging is performed substantially from the imaging directions via fight from the substantially opposed illumination direction, preferably by switching (see 0019) and/or by polarization and/or spectra] filtering and/or by use of at least one color rendering image capture device.

Regarding **claim 17**, Kodama discloses a computer-readable storage means comprising a program code (see paragraph 0030) which implements the method as set forth in claims 12 when loaded in a computer (see rejection of claim 12).

Regarding **claim 18**, Kodama discloses a device for gripping an object from a plurality of objects with image capture devices and at least three direct illumination devices (see fig. 4, 6, paragraph 0007; lighting, in each one of a plurality of different directions, at least a portion of the object, taking an image of the portion of the object and a vicinity of the portion which are lighted in the each one of the different directions, synthesizing the respective images of the portion of the object taken by lighting the portion in the different directions), wherein one image capturing device each is substantially opposed to one illumination device (see fig. 6, paragraph 0060, 0008; control device 100 sequentially

operates the LEDs 74 of each one of the predetermined lighting areas to emit light toward the EC 28. FIG. 6 shows the EC 28 and the lighting device 70, upside down, for easier understanding purposes only. The image processing program

includes, for a sort and/or a shape of each EC 28, control data to divide the LEDs 74 into a plurality of predetermined lighting areas and operate the lighting areas to sequentially emit light in a predetermined order. In the present embodiment, since the EC 28 has a rectangular surface, the LEDs 74 are divided into four lighting areas each of which lights the EC 28 in a corresponding one of four directions which are perpendicular to the four sides of the rectangular surface, respectively),

so that from each of the image capture devices at least contour each of the object can be imaged with a light side and a shadow side of the object (see fig. 6, paragraph 0060; a first one of the four lighting areas is operated to emit light, a shadow of the EC 28 is formed in a portion of a vicinity of the EC 28 that is located on one side thereof opposite to the first lighting area, so that the EC camera 72 takes an image 120 of the EC 28 and an image 122 of the shadowed portion of the vicinity of the EC 28. In FIG. 6, the image 120 of the EC 28 is indicated at broken line, because an image of the other portion of the vicinity of the EC 28 than the shadowed portion may be light and a bound between that image and the image 120 of the EC 28 may be unclear. Thus, the image 122 of the shadowed portion is significantly dark as compared with the image 120 of the EC 28 and the image of the other portion of the vicinity of the same 28. A batch of image data representing the thus taken image including the images 120, 122 is stored in one frame buffer of the RAM 106 of the computer),

and substantially the complete object can be imaged by the at least three image capture devices in combination (see fig. 6, paragraph 0060; a second, a third, and a fourth lighting area are sequentially operated to emit light toward the EC 28, so that the EC

camera 72 takes an image of the EC 28 which is lighted by each one of the second, third, and fourth lighting areas). Kodama does not teach at least three image capture devices.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to image from at least three different imaging directions. Applicant has not disclosed that image from at least three different imaging directions provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with either the two imaging directions as taught by Kodama or the claimed at least three different imaging directions because the quantity of directions perform the same function of imaging an object at multiple angles or orientations in order to have at least one image that contains the entire object and one image that contains at least a portion of the shadow created by the captured object, considering objects that are to be picked up by robots are not outlandishly large in dimension/size.

Therefore, it would have been obvious to combine to one of ordinary skill in this art to modify Kodama to obtain the invention as specified in claim 18.

Regarding **claim 19**, Kodama discloses a device for gripping an object … three image capture devices in combination (see rejection of claim 18), which is configured to use reference images and/or data derived therefrom contained in a data collection as set forth in claim 10 (see rejection of claim 10).

Regarding **claim 21**, Kodama discloses imaging is performed substantially from the imaging directions via fight from the substantially opposed illumination direction,

preferably by switching (see 0019) and/or by polarization and/or spectra] filtering and/or by use of at least one color rendering image capture device.

3. **Claims 3, 8, 9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kodama et al (US 2001/0040225 A1) in view of Murakami (US 6,763,283 B1).

Regarding **claims 3, 8, 9**, Kodama discloses all elements as mentioned above in claim 2. Kodama does not disclose changes in the relative positions between the images are captured and assigned to the images and wherein position indications assigned to the images or to the data derived therefrom are stored in the data collection; several images are made between which the position of the object is changed; and changed by means of a robotic device.

Murakami, in the same field of endeavor, teaches changes in the relative positions between the images are captured and assigned to the images and wherein position indications assigned to the images or to the data derived therefrom are stored in the data collection (see fig. 1, col. 2, lines 1-53); several images are made between which the position of the object is changed (see fig. 1, col. 2, lines 1-53); and changed by means of a robotic device (see fig. 1, col. 2, lines 1-53).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Kodama to utilize a robot to change a object position as suggested by Murakami, to enhance the functionality of the visual recognition system by allowing real time manipulation of the object by the use of an automated system (see col. 1, lines 1-50).

Allowable Subject Matter

1. Claims 4, 15, 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claims 4, 15, 20, none of the references of record alone or in combination suggest or fairly teach wherein the illumination devices and the image capture devices are arranged substantially star-shaped, the illumination directions as viewed from one direction comprising in pairs an angle between 75 degrees and 145 degrees, preferably 120 degrees and as viewed from one direction the imaging directions comprising in pairs an angle between 75 degrees and 145 degrees, preferably 120 degrees.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ELISA M. RICE whose telephone number is (571)270-1582. The examiner can normally be reached on 12:00-8:30p.m. EST Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on (571)272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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